
NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES DEPARTMENT

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

REPAIR OVERHEAD ELECTRICAL CONDUCTORS ENERGIZED

PROCEDURE NUMBER

WC 624 HVE 022

DISTR:
601A
610
620
WC 624

SIGNED:_____
(DATE)

APPROVED:_____
(DATE)

SAFETY PROFESSIONAL:_____
(DATE)

MANAGEMENT OFFICIAL:_____
(DATE)

DATE:_____ REVISION DATE:_____

REPAIR OVERHEAD ELECTRICAL CONDUCTORS - ENERGIZED

Purpose:
Procedure to repair overhead electrical conductors which are energized.

Potential Energy Sources:
1. Energized circuits in close proximity of work.
2. Deenergized circuits which are not included in the work and have not been grounded.

Tools and PPE:
Tools: Bucket truck, hand line, hot hoist or slack blocks, wire grips, rubber hoses, rubber blankets, temporary jumpers, crimping tool (XPJ or Hypress), Cutters, and temporary jumper. PPE: Nomex coveralls, Nomex hood, insulating rubber gloves, insulating rubber sleeves, hard hat, safety shoes, work gloves, safety glasses, orange vest, safety harness, and back brace if required by back injury prevention and control program. The class of rubber gloves and sleeves will depend on the exposure voltage as per the following: Class 0 - up to 1,000 volts, Class 1 - up to 7,500 volts, Class 2 - up to 17,000 volts, Class 3 - up to 26,500 volts, Class 4 - up to 36,000 volts.

References:
1. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
2. SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger Truck
3. Occupational Safety and Health Standards for General Industry (29 CFR PART 1910): Subpart I, Personnel Protective Equipment; Subpart R, Electrical Power Generation / Transmission / Distribution; Subpart S, Electrical
4. NFPA 70 E approach distances to exposed, energized, electrical conductors and circuit parts.
5. ANSI C2-1987 National Electrical Safety Code
6. Electrical Transmission and Distribution Safety Manual, P-1060
7. The Lineman's and Cableman's Handbook, 5th ED

Procedures:
1. Set up bucket truck. Refer to SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger truck for details.

2. When operating a bucket truck the following safety rules will be followed.
   a) Only an authorized person, one with a current government license to operate an aerial lift, will operate the bucket.

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   b) Do not use the bucket truck if winds exceed the truck manufacture's specified limit.
   c) Do not perform energized work in wet weather.
   d) Personnel in bucket will wear a safety harness with a lanyard attached to the boom or bucket.
   e) Do not exceed the bucket's weight limitations.

f) Stand firmly on the floor of the bucket with both feet. Do not sit on the bucket's edge or use planks, ladders, or other such devices.

3. Insulate energized conductors within 3 feet of the work area. Insulate deenergized overhead circuits within 3 feet of the work area which are not included in the work and have not been grounded as per Lockout and Tagout procedures. Personnel in the bucket shall wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat.

4. The following rules will apply to the repair job:
a) Personnel in the bucket will wear Nomex coveralls, safety glasses, safety shoes, insulating rubber gloves and sleeves, hard hat and a safety harness.
b) Personnel in the bucket will carry a hand line aloft with them.
c) Ground personnel will wear hard hats, safety shoes, work gloves, and safety glasses.
d) Ground personnel will wear orange vests if working adjacent to a road or in a parking lot.
e) Ground personnel not involved with the work will watch the personnel working aloft.
f) Ground personnel will stay clear of area underneath the bucket unless the work dictates.
g) If ground personnel are present, then at least one of them will have been trained to operate the bucket in an emergency situation where the bucket personnel are no longer able to operate the bucket controls

5. Catch off the damaged conductor. Secure hot hoist or slack blocks to conductor with wire grips. Place grips on both sides of the damaged section. Allow enough space to remove the damaged section and replace it with a sleeve or wire and sleeves. Jack hoist or blocks enough to remove the conductor tension between the grips so the wire can be removed safely.

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6. Install a temporary jumper. Place a jumper, of equal or larger size wire, on the conductor. The jumper has to span the damaged section to be removed. Insure that the loose end of the jumper is held in the clear as the first end of the jumper is attached. The jumper will be energized once the first end is attached.
Connect the loose end to the other side of the damaged conductor. The jumper will allow current to flow uninterrupted while the work proceeds.

7. Remove the damaged section of the conductor. Using cutters with insulated handles cut away the damaged section. Leave enough tail on each end to allow attachment of sleeves.

8. Replace the damaged section. Very short sections can be replaced with just a sleeve. Longer sections will require a section of wire and two sleeves, one on each end. Quick sleeves or compression sleeves may be used. Compression sleeves require a crimping tool(XPJ) or a hy-press.

9. Remove the temporary jumper. CAUTION: the jumper remains energized until both ends have been removed from the conductor. Insure that the loose end of the jumper is held clear while the final end is removed.

10. Remove the hoist and wire grips. Slack off the hot hoist or blocks until the proper tension and sag are on the conductor. Insure that the sleeves are holding, then remove the hoist and grips from the conductor.

11. Remove insulation placed on energized conductors. Remove insulation placed on conductors which are not included in the work and have not been grounded as per Lockout and Tagout procedures. Personnel in the bucket shall wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat. Remove insulation in reverse order that it was placed.

12. Secure bucket truck. Refer to SOP WC 624 HVE 001, Set Up and Secure Bucket/Auger Truck, for details.